

SEP 12 2007

Applicant(s): Ghose, et al.

Application No.: 10/695,889

Filed: 10/23/2003

Title: Failure Analysis Method and System for Storage  
Area Networks

Attorney Docket No.: 00121-0000700000

Group Art Unit:  
2114Examiner:  
Gabriel L. ChuREMARKS

In the instant office action, Claim 32 was rejected under 35 USC 112, second paragraph as being indefinite. Applicants have modified Claim 32 to better clarify the invention and address this informality. Accordingly, it is respectfully requested that this rejection of Claim 32 be withdrawn.

Further, the Examiner rejected claims 1-4, 6-11, 18-21, 23-26 and 33 under 35 USC 103(a) as unpatentable over U.S. Patent 5,666,481 to Lewis (hereinafter "Lewis") in view of U.S. Printed Publication 20020019922 to Reuter et al. (hereinafter "Reuter") and further in view of U.S. Patent 6,629,266 to Harper et al. (hereinafter "Harper").

Applicants wish to thank the Examiner for carefully reviewing the claims and specification in light of the cited art. However, the cited art does not teach or suggest claims as amended. Accordingly, Applicants respectfully submit these claims to be patentable over the cited art and would request reconsideration and allowance.

Lewis describes a method for managing communication networks using a trouble ticket system (Abstract, Col. 3, lines 36-44). According to Lewis, the term "communication network" describes a digital communication system that not only includes local area networks (LANs) but also includes wide-area networks or WANs. (Col. 1, lines 10-14.) Indeed, Lewis mentions both a LAN and a WAN as both are examples of communication networks that transmit digital information between computers. (Col. 1, lines 9-13). However, there is no mention of storage

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area networks (SAN) in Lewis that manage both the storage and transmission of data over a network.

The trouble ticket system in Lewis is driven by a database collection of trouble tickets collected from the past. (Col. 6, lines 39-42). Trouble tickets allow users to enter descriptive information on a network condition but not the actual errors (Col. 1, lines 35-40.) Users can only enter observations or symptoms of a network condition as they appear to the user. The actual errors in the network causing the network condition are not known to the user and not recorded in the trouble ticket system. (Col. 1, lines 61-66.)

In fact, the trouble ticket system in Lewis is driven by the symptoms or observations reported in the past and not by rules created in advance. (Col. 6, 33-50). Lewis is limited to operating with "case based reasoning" (CBR) and explicitly excludes the use of "rule based reasoning" (RBR) that associates error patterns with error actions. (*Id.*) Each trouble ticket in Lewis represents a case that is then used to drive a solution. According to Lewis, initializing systems with rules that to associate error patterns with error actions does not work and eventually will fail. (Col. 2, lines 50-67). For at least this reason, Lewis makes a strong argument that "case based reasoning" should be used and, in contrast, "rule based reasoning" involving the use of rules should avoided. (*Id.*)

Contrary to the Examiner's assertion, Lewis alone or in combination with the cited art does not teach each and every feature of the invention as claimed. It is well settled that "[t]he examiner bears the initial burden of factually supporting any prima facie case of obviousness.

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To establish a prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In re Royka , 490 F.2d 981, 180 USPQ 580 (CCPA 1974). To make a prima facie case of obviousness, the Examiner must determine the "scope and content of the prior art," ascertain the "differences between the prior art and the claims at issue," determine "the level of ordinary skill in the pertinent art," and evaluate evidence of secondary considerations. Graham v. John Deere, 383 U.S. 1, 17, (1966); KSR Int'l Co. v. Teleflex Inc., 550 U.S. \_\_\_\_ (2007); see also M.P.E.P. § 2141.

And, when determining the differences between the applied art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. M.P.E.P. § 2141.02(I). "All words in a claim must be considered in judging the patentability of that claim against the prior art." In re Wilson , 424 F.2d 1382, 165 USPQ 494, 496 (CCPA 1970). If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness." M.P.E.P. § 2142. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. In re Fine , 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Contrary to the office action's assumption, Lewis does not operate by "initializing a primary failure analysis module for processing error events and error actions" as recited in Claim

1. The office action assumes that "a functioning process must have been initialized at some

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point” (Office Action Page 2, Paragraph 4) yet this runs contrary to the very statements and facts of Lewis. Several times, Lewis expressly teaches away from attempting to initialize any failure analysis modules in advance with combinations of error events and associating them directly with predetermined error actions. (Col. 2, lines 22-66) For example, Lewis claims using rules to initialize any failure analysis module with error events and associated error actions results in “unwieldly, unpredictable, and unmaintainable” (Col. 3, lines 5-9) systems most likely to become obsolete. According to Lewis, rule based reasoning also suffers from other various computing and logistical problems. (Col. 2, lines 58-67; “brittleness”; Col. 3, lines 1-10; “knowledge acquisition bottleneck”; Col. 6, lines 33-40). This language in Lewis states quite strongly that others have attempted to initialize a failure analysis module with error events and error actions using rules and have failed.

It also follows that Lewis does not describe or even suggest “identifying one or more predetermined error actions and one or more error events associated with the storage area network” as recited in claim 1. Indeed, Lewis does not identify error events as recited in claim 1 but instead identifies “cases” using “case-based reasoning” or CBR. (Col. 6, lines 33-39). Lewis makes it a point that a “case” or “scenario” described by a trouble ticket is distinguishable over a combination of error actions and error events – this is a central concept to Lewis. (Col. 3, lines 11-20; Col. 6, lines 33-39.) Lewis very specifically identifies “cases” having “particular, specific, fault resolution scenarios stored in completed trouble tickets” and teaches away from identifying error actions and error events. (*Id.*) By operating on cases, Lewis attempts to resolve

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faults by operating with a different approach. Specifically, if a trouble-ticket matches exactly, Lewis immediately performs the resolution performed previously in the matching trouble ticket. (Col. 8, lines 55-60) In the event there is not an exact match, Lewis describes adapting the trouble-ticket using a parameterized adaptation module and other approaches. (Col. 8, lines 60-67; Col. 9, lines 1-67).

Further, there is no reason to combine Lewis with Reuter as they deal in non-office action art. The Supreme Court in KSR stated that it is "important [for an examiner] to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements" in the manner claimed. *KSR Int'l Co. v. Teleflex, Inc.*, No. 04-1350, slip op. at 14 (U.S. April 30, 2007). The Court indicated that there should be an "explicit" analysis regarding "whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *Id.* (emphasis added). Further, the Court did not reject the use of "teaching, suggestion, or motivation" test as a factor in the obviousness analysis, but rather stated that this test may be indicative of non-obviousness under 35 U.S.C. § 103. *Id.* at 14-15.

In the instant office action, Lewis clearly applies to communication networks and not storage area networks. There is no teaching, suggestion or motivation to apply technology in communication networks to storage area networks as they address distinctly different problems – communication networks deals primarily with data transmission and storage networks with data storage. For at least this reason, it is improper for the office action to combine the networks described in Lewis with the storage systems found in Reuter.

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Moreover, two criteria are relevant in determining whether prior art is not analogous and should not be combined: (1) whether the art is from the same field of endeavor, regardless of the problem addressed, and (2) if the art is not within the same field of endeavor, whether it is still reasonably pertinent to the particular problem to be solved. *Wang Laboratories, Inc. v. Toshiba*, 993 F. 2d 858, 26 USPQ2d 1767 (Fed. Cir 1993).

In this case, Lewis concerns network systems and the management of trouble tickets used for resolving network faults. As mentioned in the office action, there is no mention of storage systems in Lewis and only other communication networks. Hence, the field of endeavor in Lewis is limited to identifying faults in a conventional communication network and does not concern storage systems.

In contrast, Reuter concerns the management of certain mapping tables used to virtualize storage area network (SAN) systems. (Paragraph 9 of Reuter). Trouble ticket management in a communication network is unrelated to virtualization of storage in the SAN. In particular, Reuter is concerned with improving the performance characteristics associated with storing data and accessing stored data using distributed mapping tables. (Paragraph 13, Paragraph 34). Indeed, Reuter manages page faults typical of virtual storage systems but these are not the same type of faults or errors being managed by Lewis. Both Lewis and Reuter use the word "fault" but because they cover distinctly different areas of technology the words have distinctly different meanings. Applicants respectfully submit that the office action had improperly equated handling of page faults in Reuter with handling of errors in Lewis – these are not related. (Page 3 of the

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Office Action) For example, Reuter's handling of "faults" relates to distributed agents dealing with mapping table entries for the virtual disk but is not relevant to handling errors. (Paragraph 34 of Reuter.)

Moreover, the trouble ticket system described in Lewis is not reasonably pertinent or related to managing the storage and movement of data in a storage network as described by Reuter. The problem to be solved in Lewis concerns determining a resolution to a network fault that occurs when a system fails or does not work correctly. This is not pertinent to a method of managing the virtual table mappings in Reuter.

In summary, Lewis and Reuter should not be considered analogous art for several reasons: first, they are not from the same field of endeavor as one concerns tracking and resolving network faults in a network and the other concerns managing virtualized storage. Second, the method of tracking trouble tickets and resolving network faults is not related to managing virtual storage and page faults in a storage network.

Even if it were proper to combine Lewis with Reuter, the combination does not teach or suggest "specifying, according to one or more rules, an error pattern based upon a combination of one or more error events in the storage area network" and "associating an error action to perform according to the one or more rules and in response to receiving the combination of one or more error events of the error pattern" as recited in amended claim 1. As previously described, Lewis uses specific trouble tickets and scenarios to resolve errors and teaches away from specifying errors patterns based up one or more rules. (Col. 6, lines 33-39.)

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Reuter does not concern processing either scenarios or errors that may occur on SAN. If an error occurs in a SAN, Reuter ignores the storage location, passes the error code to an application but performs no error actions. (Paragraph 27, lines 1-9 of Reuter.)

Indeed, Lewis combined with Reuter and further with Harper does not teach or suggest "initializing...an alternate failure analysis module configured as a back to the primary failure analysis module to facilitate high-availability and redundancy" as recited in claim 1. As previously described, Lewis teaches away from initializing error events and error actions. Further, Lewis indicates that many have tried to create systems that specify error events and error actions but have failed for many different reasons. (Col. 3, lines 5-10).

For at least these reasons, independent claims 1, 18 and 33 as currently filed are in condition for allowance. Dependent claims 2-4, 6-11, 19-21, 23-26 are allowable independently as well as by virtue of their direct or indirect dependency on claims 1 and 18 respectively.

The Examiner also rejected claims 12-16, 27-31 and 34 under 35 USC 103(a) as unpatentable over Lewis in view of Reuter and further in view of U.S. Patent to Feridun et al. (hereinafter "Feridun"). The Examiner further noted that claim 17 was allowable if rewritten to include all of the limitations of the base claim 12 and any intervening claims.

For reasons previously described, Lewis does not operate by "initializing a primary failure analysis module for processing error events and error actions" as recited in Claim 12. The office action assumes that "a functioning process must have been initialized at some point" (Office Action Page 2, Paragraph 4) yet this runs contrary to the very statements and facts of

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Lewis. Several times, Lewis expressly teaches away from attempting to initialize any failure analysis modules in advance with combinations of error events and associating them directly with predetermined error actions. (Col. 2, lines 22-66)

For example, Lewis claims using rules to initialize any failure analysis module with error events and associated error actions results in “unwieldly, unpredictable, and unmaintainable” (Col. 3, lines 5-9) systems most likely to become obsolete. According to Lewis, rule based reasoning also suffers from other various computing and logistical problems. (Col. 2, lines 58-67; “brittleness”; Col. 3, lines 1-10; “knowledge acquisition bottleneck”; Col. 6, lines 33-40). This language in Lewis also strongly implies that others have attempted to initialize a failure analysis module with error events and error actions and failed.

As the Examiner has noted, Lewis also does not teach or suggest “comparing, according to one or more rules, a temporal arrangement of the error events received against a set of error patterns loaded in the failure analysis module” as recited in amended claim 12. (Page 8 of the Office Action) Not only does Lewis not record error events or contemplate a SAN device, there is no teaching, suggestion or motivation to perform a temporal comparison of error events according to one or more rules. Indeed, Lewis operates on “cases” or “scenarios” and therefore cannot perform discrete temporal comparison of events for further analysis. (Col. 6, lines 36-39). Since Lewis teaches away from using rule based reasoning (RBR) then Lewis should not be combined with the use of correlation rules in Feridun.

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Even if they were combined, Lewis with Reuter and further in view of Feridun does not teach or suggest the limitations as recited in claim 12. Indeed, in order to determine whether one of ordinary skill has good reason to combine known options depends on when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions within the person's technical grasp. *KSR Int'l Co. v. Teleflex, Inc.*, No. 04-1350, slip op. at 17 (U.S. April 30, 2007) Here, Feridun provides a correlation engine for processing correlator rules that may be programmed with potentially infinite different correlations and solutions. (Col. 9, lines 1-67; Col. 10, lines 1-67.) Accordingly, it cannot be expected that one skilled in the art would try to perform a comparison temporally in the fashion described in claim 12 as there is much more than a finite number of solutions.

For at least these reasons, independent claims 12, 27, 34 and 36 remain patentable over the cited art. Dependent claims 13-17, 28-32 are not only independently patentable but also allowable by virtue of their dependency on independent claims 12 and 27 respectively.

The Examiner also rejected claims 35 under 35 USC 103(a) as unpatentable over Lewis in view of Reuter and further in view of "threshold" by IEEE 100 The Authoritative Dictionary of IEEE Standards Terms, December 2000, Standards Information Network IEEE Press, Seventh Edition, p. 1177 and "graphical user interface" by Microsoft computer dictionary, Third Edition, Microsoft Press, 1997, pg. 220 (herein "MSCD").

As previously noted, even if the Lewis and Reuter combination were made they do not teach or suggest each and every element of claim 35. For example, Lewis and Reuter

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individually or combined do not teach or suggest "identifying one or more predetermined error actions and one or more error events associated with the storage area network" and "specifying an error pattern based upon a combination of one or more error events in the storage area network, presented through a graphical user interface with corresponding threshold values." as recited in claim 35 since neither Reuter and Lewis deal with errors. Lewis only processes "cases", "scenarios" or trouble-tickets and teaches away from processing error patterns based upon a combination of one or more error events. (Paragraph 27, lines 1-9 of Reuter.)

For at least these reasons, independent claims 1, 12, 18, 27, 33, 34, 35 and 36 as currently filed are in condition for allowance. Dependent claims 2-4, 6-11, 13-16, 19-21, 23-26, 28-32 are allowable independently as well as by virtue of their direct or indirect dependency on claims 1, 12, 18, 27, 33, 34, and 35.

Applicants have made a diligent effort to place the aforementioned claims in condition for allowance. Accordingly, Applicants respectively request a withdrawal of the rejections and immediate allowance of the pending claims. Of course, should there remain unresolved issues or the Examiner believes a discussion appropriate, it is respectfully requested that the Examiner telephone Leland Wiesner, Applicants' Attorney at (650) 853-1113 so that such issues may be resolved as expeditiously as possible.

For these reasons, and in view of the above remarks, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,  
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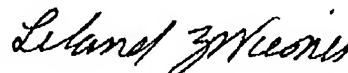
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